¹ Contrôle continu N⁰: 2

Exercice 1: Résoudre les équations suivantes :

a)
$$2y'' - 7y' + 3y = x^2 - 2e^{2x}$$

b)
$$y' \sin x + y \cos x = 1$$

Exercice 2:

a) Trouver les valeurs a, b, c et d telles que :

$$\frac{1}{x^4+1} = \frac{ax+b}{x^2+x\sqrt{2}+1} + \frac{cx+d}{x^2-x\sqrt{2}+1}$$

- b) Calculer $I = \int_0^1 \frac{1}{x^4 + 1} dx$
 - c) Déduire

i)
$$J = \int_0^1 \frac{1}{(x^4 + 1)^2} dx$$

ii)
$$K = \int_0^1 \frac{x+1}{(x^4+1)^2} dx$$
.

Exercice 3: Calculer les limites suivantes en utilisant le DL

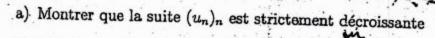
a)
$$\lim_{x\to 0} \frac{1}{x} - \frac{1}{\ln(1+x)}$$

a)
$$\lim_{x\to 0} \frac{1}{x} - \frac{1}{\ln(1+x)}$$
 b) $\lim_{x\to +\infty} x^2 [\ln(x+\sqrt{1+x^2}) - \ln x]$

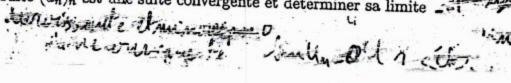
如何没有了强急

Exercice 4: Soit la suite récurente $(u_n)_n$ définie par :

$$\begin{cases} u_n := \ln(1 + u_{n-1}) \\ u_0 > 0 \end{cases}$$



b) Déduire que la suite $(u_n)_n$ est une suite convergente et déterminer sa limite





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Institut la centrale
                                                                              CC2 08-09
Execuser a/ (E): 2y"-7y"+3y = x2-2e2x
. Resolution de (E'): 2y"-7y1+3y=0
     l'eq caracteristique associate est: 222-77+3=0 b=25,7=1/4,72=3
                                yn = de ME + Be3H sol de(E')
· Solution particuliere yo de (E) s'east yo = you tyoz avec you sol particulière de
   l'eq (En): 2y"-7y1+3y= x2 et goz sul partirlere de (Ez): 2y"-7y'+3y=-2e4
 . 431 = an +bn+c can deg (n2) = 2 et c +0
     Alors 2901 - 7501 +3901 = N2 = 40-14an-76+3an2+5n+3c= N2 = 1 -14a+6=0
       = a = 1/3; b = 1/4; c = 86 = 1/3 n2 + 1/4 n + P6
 · you = a e 2x car m = 2 n'est par ragne de l'eq carocleristique
     yor = 2a e2n, 4/2 = 4a e2n
     Alon 29,11-79,2+342=-lety; 8ae2-14ae2+3ae2+=-lety = -3a=-2=)a=2
            =) y_{02} = \frac{2}{3}e^{2u} =) y_0 = y_{01} + y_{02} = \frac{1}{3}x^2 + \frac{14}{9}u + \frac{86}{27} + \frac{8}{3}e^{2u}
                   et y = y1+y0 = de 1/2+ pe3x + 1/3 x1+ 1/4 x+ 1/2 + 1/3 e24 sol de E
     • (E'): y' sink + y cosk = 0 \rightarrow \frac{y'}{y} = -\frac{\omega h}{\sin k}; \ln |y| = -\ln |\sin k| + C \Rightarrow y = \frac{k}{\sin k}
   b/ (E): y/sinx+ycox=1
     , Deleminous une solution particuliere de E sons le some yo = K , avec k varieble
             Yo' = KISINH - KCON , Alers Yo'SINK+YO WIN = 1 =) KISINH-KCON + KCON = 1
            =) K' = A = 1 K = 1  et y_0 = \frac{11}{s_{10}N} d'où y = y_0 + y_0 = \frac{K + K}{s_{10}N} sol de(E)
  \frac{E_{1}e_{1}e_{2}e_{2}}{\chi^{4}+\Lambda} = \frac{\alpha_{1}+b_{2}}{\chi^{2}+\kappa\sqrt{2}+\Lambda} + \frac{c_{1}+b_{2}}{\chi^{2}-\kappa\sqrt{2}+\Lambda} \Rightarrow \Lambda = (\alpha_{1}+b_{2})(\chi^{2}-\kappa\sqrt{2}+1)+(\chi^{2}+\kappa\sqrt{2}+1)(c_{1}+b_{2})
   (a+c) x^{3} + (-a\sqrt{2} + b + c\sqrt{2} + d) x^{2} + (a-b\sqrt{2} + c + d\sqrt{2}) x + b + d = 1
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(a+c) x^{3} + (-a\sqrt{2} + b + c\sqrt{2} + d) x^{2} + (a-b\sqrt{2} + c + d\sqrt{2}) x + d = 1

\begin{array}{ll}
c = -a \\
d = 1 - b
\end{array}

\begin{array}{ll}
c = -a \\
-a \sqrt{2} + b - a \sqrt{2} - b + 1 = 0
\end{array}

\begin{array}{ll}
c = -\frac{\sqrt{2}}{4} \\
c = -\frac{\sqrt{2}}{4} \\
d = \frac{\sqrt{2}}{4}
\end{array}

\begin{array}{ll}
d = \frac{\sqrt{2}}{4} \\
c = -\frac{\sqrt{2}}{4}
\end{array}

       C = -a
     \sqrt{\frac{\Lambda}{N^{4}+1}} = \frac{\frac{\sqrt{2}}{4}}{N^{2}+N\sqrt{2}+1} + \frac{-\frac{\sqrt{2}}{4}}{N^{2}-N\sqrt{2}+1} = \frac{\sqrt{2}}{4} \left( \frac{N+\sqrt{2}}{N^{2}+N\sqrt{2}+1} - \frac{N-\sqrt{2}}{N^{2}-N\sqrt{2}+1} \right)
                                  = \frac{\sqrt{2}}{8} \left( \frac{2 n + 2 \sqrt{2}}{N^2 + N \sqrt{2} + 1} - \frac{2 n - 2 \sqrt{2}}{N^2 - N \sqrt{2} + 1} \right) = \frac{\sqrt{2}}{8} \left( \frac{2 x + \sqrt{2} + \sqrt{2}}{N^2 + N \sqrt{2} + 1} - \frac{2 n - \sqrt{2} - \sqrt{2}}{N^2 - N \sqrt{2} + 1} \right)
```

$$\frac{A}{N^{4}+A} = \frac{\sqrt{2}}{I} \left(\frac{2N+\sqrt{2}}{N^{4}+N^{2}+A} + \frac{\sqrt{2}}{(y+\frac{1}{2})^{4}+\frac{1}{4}}{2} + \frac{2N-\sqrt{2}}{N^{4}+N^{2}+A} + \frac{\sqrt{2}}{(y+\frac{1}{2})^{4}+\frac{1}{4}}{2} - \frac{N-\sqrt{2}}{N^{4}+N^{2}+A} + \frac{\sqrt{2}}{2} \cdot \frac{N^{2}}{N^{4}} + \frac{N}{2} \cdot \frac{N^{2}}{N^{2}} + \frac{N^{2}}{N^{2}} \cdot \frac{N^{2}}{N^{2}} \cdot \frac{N^{2}}{N^{2}} + \frac{N^{2}}{N^{2}} \cdot \frac{N^{2}}{N^{2}} \cdot \frac{N^{2}}{N^{2}} + \frac{N^{2}}{N^{2}} \cdot \frac{N^{2}}{N^{2}} + \frac{N^{2}}{N^{2}} \cdot \frac{N^{2}}{N^{2}} \cdot$$



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